

COMMUNICATION SYSTEM AND METHOD

BACKGROUND OF THE INVENTION

Claim of Priority

The present application is a continuation-in-part application of previously filed, now pending application having Serial No. 09/577,812, filed May 23, 2000.

Field of the Invention

This invention is directed to a system and method of establishing wireless communication either over the Internet, through an Internet access facility, such as a computer, or alternatively by a compatible over-the-air network, dependent on whether the wireless communication device and the Internet access facility are relatively located inside or outside a pre-established vicinity range. The system includes auto-switching capabilities for determining the route of communication with the wireless communication device dependent, at least in part, on predetermined parameters, which may include the pre-established vicinity range and recognition of a unique identifier associated with at least the wireless communication device.

DESCRIPTION OF THE RELATED ART

At the present time, it is well recognized that the

1 wireless communication industry is enjoying a period of dramatic
2 growth. Although the number of subscribers is still relatively
3 low, as compared to the maximum capacity available, carriers are
4 offering networks with excellent coverage, lower prices and an
5 increasing variety of additional options. As such, there is a
6 recognized limit to the traditional wireless communications
7 capabilities. As such, even with the recent advancements in
8 wireless communication technology there exists even more
9 opportunity to provide subscribers with vastly improved wireless
10 communication standards.

11 Additionally, it is recognized that with the increasing
12 popularity of local or global computerized networks, individuals
13 are relying more and more heavily on alternate means of
14 communication and information gathering. Still, however, each
15 of these communications mediums, despite their usefulness, are
16 maintained generally independent from one another, requiring a
17 user to utilize the specified technological medium applicable.
18 Moreover, as the technologies are maintained generally
19 independent from one another, they do not take full advantage of
20 integration possibilities available due to advances in
21 technology. For example, one increasingly popular medium for
22 wireless communication relates to the use of "Bluetooth"
23 technology. Such technology allows short range, wireless
24 communication between devices, thereby providing more
25 versatility and eliminating many cabling

1 limitations/requirements that may limit expansion. Still,
2 however, despite the advantageous nature of such wireless
3 communications protocols, the use of such technology is
4 currently limited to traditional communicative links, replacing
5 a more traditional connectivity solution. As such, the art has
6 failed to truly explore the cross-over potentials available
7 through the expansion of such technology.

8 Accordingly there is a substantial need in the art for a
9 system and method which enables the integration or cross-over of
10 various generally related technologies so as to substantially
11 increase the versatility and productivity of the communications
12 services offered. Specifically, as will be described within the
13 context of the present invention and has yet been un-addressed
14 in the art, such improved technology could include a hybrid
15 communication system which will operate using standard flex
16 paging protocol in combination with Bluetooth or similar
17 technology for short range messaging. Such an improved hybrid
18 communication system should have the ability to automatically
19 switch to messaging communication with the wireless
20 communication device using, for example, an Internet access
21 facility, such as a personal computer (PC), when two
22 transceivers incorporating the Bluetooth or equivalent
23 technology are within the pre-established vicinity range.
24 Alternatively, such an improved system as provided by the
25 present invention could automatically switch to over-the-air

1 network messaging with the wireless communication device, when
2 outside the pre-established vicinity range, representing
3 substantial savings for both the carriers and the users. In
4 particular, carriers could save money by freeing up limited band
5 width and thereby have the capacity to subscribe more users,
6 while not having to upgrade current infrastructure hardware.
7 Users on the other hand could save money because they would have
8 the ability to send and receive large messages and e-mail
9 wirelessly, when within the aforementioned pre-established
10 vicinity range, at a cost no more than the cost of their current
11 network connection, plus current one-way messaging service.

12 13 SUMMARY OF THE INVENTION

14 This invention is directed to a system and method of hybrid
15 communication which provides data communication including, but
16 not limited to, voice, video and/or alphanumeric messaging,
17 either over the computerized network, such as the Internet,
18 using an appropriate access facility, such as a personal
19 computer, or alternatively by means of an over-the-air network
20 such as, but not limited to, a cellular/paging network,
21 satellite communication and other applicable types of
22 communication networks. The wireless communication device, as
23 set forth above, may include a pager, cellular telephone,
24 personal digital assistant (PDA) or other applicable wireless
25 communication devices structured and designed to perform data

1 communication.

2 The system and method of the present invention incorporates
3 a transceiver assembly operative on a recognized spread spectrum
4 standard capable of short range communication such as "Bluetooth
5 technology". As is recognized in the communication field,
6 Bluetooth technology incorporates 2.4 GHz wireless data solution
7 utilizing spread spectrum techniques as set forth in detail
8 above. However, as utilized hereinafter the term "transceiver
9 assembly" refers to any type of short range technology operable
10 in the fashion of "Bluetooth technology" but not limited
11 thereto.

12 More specifically, the hybrid communication system and
13 method of the present invention comprises the utilization of one
14 or more wireless communication devices, of the type set forth
15 above, each having a transceiver connected thereto and operable
16 on a short range radio frequency (RF), wherein each of the
17 plurality of wireless communication devices include a unique
18 identifier or code capable of being recognized by another
19 compatible transceiver, which also defines a part of the
20 aforementioned transceiver assembly. More specifically, a first
21 transceiver designed to function in accordance with Bluetooth or
22 equivalent technology, is connected to an Internet access
23 facility such as, but not limited to, a computer facility or PC.
24 A second transceiver is connected to the wireless communication
25 device. Obviously, the system and method of the present

1 invention contemplates the provision of a plurality of network
2 access facilities or computers and a plurality of wireless
3 communication devices, wherein, for purposes of clarity, each of
4 the aforementioned plurality of computers may be connected to a
5 first transceiver and each of the aforementioned plurality of
6 wireless communication devices may be connected with a second
7 transceiver. The unique identifiers associated with each of the
8 plurality of wireless communication devices are unique onto
9 themselves and serve as an identifying code to any one of the
10 appropriately programed or configured first transceivers
11 associated with different ones of the plurality of computers.
12 Recognition and the establishment of messaging communication may
13 be dependent, at least in part, on at least one predetermined
14 parameter. One such predetermined parameter may be a vicinity
15 range, wherein the first and second transceivers, in order to
16 recognize one another must be within a pre-established vicinity.
17 Currently such a pre-established vicinity range may be generally
18 about 100 meters. However, it is emphasized that the vicinity
19 range is not limited to 100 meters and can vary greatly based at
20 least in part on technological advancements and the specific
21 applications of the present invention. Another possible
22 predetermined parameter may be the unique identifier itself,
23 wherein communication between any one of the plurality of
24 network access facilities or computers must identify and accept
25 the unique identifier or code of the wireless communication

1 device as well as be within the predetermined vicinity range.
2 As set forth above, the vicinity range may be pre-established
3 and determined based on current technological standards and may
4 vary greatly.

5 The communication system and method of the present
6 invention also incorporates auto-switching capabilities, wherein
7 data communication is automatically established with the access
8 facility when at least one, or both of the aforementioned
9 predetermined parameters (vicinity range and identification)
10 have been established and wherein a first transceiver associated
11 with the Internet access facility and the second transceiver
12 associated with the wireless communication device are configured
13 to recognize and accept one another to establish such
14 communication. Alternatively, the auto-switching capabilities
15 of the present invention establishes data communication by means
16 of a compatible over-the-air network, such as an appropriate
17 paging/cellular network, satellite communication, etc. when
18 either or both of the predetermined parameters between a given
19 access facility and a corresponding wireless communication
20 device are not met. More particularly and also by way of
21 example only, the wireless communication device, when in the
22 acceptable vicinity range of a computer, wherein both
23 incorporate a first and second transceiver as set forth above,
24 can perform data communication over the network, such as the
25 Internet, by means of the computer or other access facility.

1 However, when the wireless communication device is disposed
2 beyond the established vicinity range, the auto-switching
3 capabilities will automatically provide for data communication
4 with the wireless communication device by means of the over-the-
5 air network, as set forth above. The wireless communication
6 device associated with the system and method of the present
7 invention is therefore capable of being operative over at least
8 two distinct frequency ranges, dependent on data communication
9 being established with the computer or Internet access facility
10 or a paging/cellular infrastructure, which may define a
11 compatible over-the-air network.

12 Other features of the system and method of the present
13 invention comprise the transceiver assembly, whether
14 incorporating Bluetooth technology or its equivalent, including
15 a scanning capability wherein scanning for recognition,
16 preferably of the unique identifier associated with each of the
17 transceivers is conducted and when the aforementioned
18 predetermined parameters, including for example an acceptable
19 vicinity range of 100 meters or other pre-established distance,
20 is met, mutual recognition of the first and second transceivers
21 is accomplished. Such scanning may therefore be referred to as
22 a "find-me-follow-me" procedure which may occur on a
23 substantially continuous basis.

24 In addition to the above, the communication system and
25 method of the present invention also may include configuration

1 capabilities. This allows messages which would be normally
2 communicated by means of the over-the-air network to be "stored"
3 until communication with a particular one of the plurality of
4 wireless communication devices is established with an
5 appropriate computer incorporating the transceiver assembly
6 technology of the type set forth above. Then, communication is
7 established between the computer and the particular wireless
8 communication device to which the messages were originally sent.
9 Alternatively, the configuration capabilities may allow the
10 selective configuring of the system, such that any stored
11 messages would be transmitted only during a pre-selected time
12 window. Such configuring of course may assume a variety of other
13 data regulating configurations.

14 One advantage of the hybrid communication system and method
15 of the present invention which may serve as an incentive is the
16 concept of "revenue sharing". More specifically, the system
17 provides the capability of the owner of a computer to decide
18 which wireless communication devices may have access to the
19 network, utilizing his or her computer, assuming that both the
20 computer and any one of the plurality of wireless communication
21 devices are associated with the same piconet of the Bluetooth or
22 equivalent transceiver assembly technology. The system may
23 include security software allowing only wireless devices with
24 "permission" to be able to access the computer's network. As
25 the incentive to open access to others, including strangers,

1 revenue sharing would involve the service provider system giving
2 credit, in the form of money or other incentives, to the owner
3 of the computer which allows access to "stranger" wireless
4 communication devices.

5 These and other features and advantages of the present
6 invention will become more clear when the drawings as well as
7 the detailed description are taken into consideration.

8 9 BRIEF DESCRIPTION OF THE DRAWINGS

10 For a fuller understanding of the nature of the present
11 invention, reference should be had to the following detailed
12 description taken in connection with the accompanying drawings
13 in which:

14 Figure 1 is a schematic representation of the hybrid
15 communication system and method of the present invention; and

16 Figure 2 is a schematic representation in flow chart form
17 of certain operative steps which are representative of and at
18 least partially define the system and method of the present
19 invention.

20 Like reference numerals refer to like parts throughout the
21 several views of the drawings.

22 23 DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

24 The present invention relates to a system and method of
25 hybrid communication wherein communication is established with

1 any one of a plurality of wireless communication devices,
2 generally indicated as 10 in Figure 1. Such wireless
3 communication devices may of course include a pager assembly,
4 cellular telephone, PDA, etc. More importantly, messaging
5 communication can be established with any of the plurality of
6 wireless communication devices 10 either by means of a global or
7 local computerized network, such as for example, the Internet 12
8 through an Internet service provider 15 including one or more
9 servers 16, or alternatively by a compatible over-the-air
10 network, generally indicated as 14, also including appropriate
11 servers 18. The over-the-air network can be defined by any
12 compatible paging and/or cellular infrastructure, satellite
13 communication 17 or other appropriate communication facilities,
14 dependent on the type of wireless communication device 10 being
15 utilized and a variety of other related factors.

16 In one preferred embodiment of the present invention, a
17 transceiver assembly is utilized to provide possible short range
18 wireless communication. By way of example, this transceiver
19 assembly may be in the form of or incorporate Bluetooth
20 technology. Specifically, Bluetooth technology is a used for
21 short range communication between various devices and is the
22 official name of a specification that has become one of the
23 fastest growing technology standards in recent times. Simply
24 put, Bluetooth is a specification for a global wireless
25 technology standard that allows devices to communicate with each

1 other using a secure radio frequency. As such, the use of a
2 Bluetooth transceiver enables at least short range communication
3 without the burden of cables, but at a high rate of data
4 transmission, without line-of-site requirements, typically
5 necessary for infrared technology. In such an embodiment, the
6 transceiver assembly may include at least one small, low power
7 radio transceiver mounted on a chip that communicates with other
8 Bluetooth-enabled device. Because it operates on radio
9 frequency (RF) Bluetooth eliminates the need for cables and can
10 connect on a one-to-one or on a one-to-many basis. In addition,
11 at least the illustrated Bluetooth transceiver has the enhanced
12 versatility of supporting voice and video data as well as other
13 data communications, thereby allowing it to be extended into
14 hands-free voice communications. In an embodiment wherein the
15 Bluetooth technology is integrated, it may use a 2.4GHz range,
16 spread spectrum standard radio band, which is un-licensed and
17 available almost worldwide. In addition, the transceiver
18 assembly is preferably capable of transmitting through solid,
19 non-metal objects, enjoying an operative range of generally from
20 10cm to 10m, which is typically extended to a vicinity range of
21 about 100 meters, by increasing the transmitting power, and is
22 omni directional, supporting both isochronous and asynchronous
23 services.

24 Also in the illustrated embodiment incorporating the
25 Bluetooth technology, such a transceiver assembly enables a

1 connection and communication wirelessly via short-range, ad hoc
2 networks and can normally support up to eight peripheral devices
3 in a "piconet", which may be defined as two or more Bluetooth or
4 equivalent technology units sharing a common channel.
5 Furthermore, the transceiver assembly may be structured to
6 provide synchronous voice channels which allows the assembly to
7 reserve bandwidth for carrying digital voice data. As such, the
8 system can support three or more simultaneous, full duplex voice
9 conversations within a given piconet.

10 Also in this embodiment wherein a Bluetooth or similar
11 transceiver is utilized, authentication and encryption is
12 preferably provided in its baseband protocol. For example, the
13 authentication may rely on a challenge/response protocol
14 utilizing a unique identifier (password, PIN, etc.). Two
15 devices communicating with one another within the appropriate or
16 pre-established vicinity range must contain or have recognition
17 of the same unique identifier. This protocol allows each device
18 to authenticate the other, automatically. After the devices are
19 authenticated it is possible to encrypt transmission for added
20 security.

21 Additionally, it is noted that the Bluetooth and equivalent
22 transceiver assembly technology integrated into the present
23 invention may be designed to carry voice, data and video
24 information at approximately, but not limited to, 760 Kbps.
25 While this speed of data transmission is not favorably compared

1 to present day wire speed, it is equal to or substantially
2 better than the speed achieved by current digital subscriber
3 lines (DSL) or cable modem services. At this speed, the
4 transceiver assembly can handle video or full stereo sound, and
5 can supply high resolution images at a somewhat lower frame rate
6 while simultaneously carrying voice and data streams.

7 Of course, despite the preceding, it is emphasized that the
8 system and method of the present invention utilizes the term
9 "transceiver assembly", which in the context of the present
10 invention, is meant to include the aforementioned Bluetooth
11 technology or any other transceiver technology utilizing an
12 applicable frequency and/or short range communication standard
13 which may or may not have all of the functional characteristics
14 of Bluetooth. As such, the system and method of communication
15 of the present invention is not meant to be limited to Bluetooth
16 technology, and the subsequent specific description utilization
17 and explanation of certain characteristics previously recited as
18 being characteristic of a Bluetooth transceiver are not intended
19 to be limited to such technology.

20 Accordingly, the transceiver assembly of the present
21 invention comprises at least one transceiver, preferably in the
22 form of a transceiver chip operative on radio frequencies (RF),
23 wherein such a first transceiver 19 is connected to one or a
24 plurality of network access assemblies, such as a PC or like
25 computer facility generally indicated as 20. The transceiver

1 assembly of the system and method of the present invention also
2 includes at least a second transceiver also in the form of a
3 radio chip connected to or incorporated within each of the
4 plurality of wireless communication devices 10. Each of the
5 wireless communication devices 10 may also include a unique
6 identifier or "code" to facilitate recognition between the first
7 and second transceiver chips 19 and 21. As explained in greater
8 detail hereinafter, the unique identifier may define one of a
9 plurality of predetermined parameters, more specifically
10 referred to as an identification parameter, utilized to
11 establish messaging communication with appropriate ones of a
12 plurality of wireless communication devices 10. When recognized
13 each of the wireless communication devices 10 becomes part of
14 a piconet, generally indicated as 24, which may exist in a home,
15 office, or any other area incorporating one or more Internet
16 access facilities or computers 20. The piconet 24 may be
17 defined by the operative features of the aforementioned
18 transceiver assembly. At least one other predetermined
19 parameter which may be established, based at least in part on
20 the short range frequency standard on which the transceiver
21 assembly operates, is a pre-established vicinity range. More
22 specifically, the pre-established vicinity range may be
23 currently defined as about 100 meters. However, it is
24 emphasized that the actual vicinity range incorporated in the
25 present invention may vary greatly and is not limited to the

1 indicated 100 meters. The pre-established vicinity range
2 therefore allows data communication, over the computerized
3 network, such as the Internet 12, with the wireless
4 communication device 10, by means of the computer 20, provided
5 that the first transceiver 19 associated with the computer 20
6 and the second transceiver 21 associated with the wireless
7 communication device 10, are compatible or configured to
8 recognize one another. In order to accomplish this
9 identification parameter, the maximum distance between the
10 wireless communication device 10 and the computer 20 must be
11 within the pre-established vicinity range, which of course may
12 vary, as described above.

13 Each of the plurality of wireless communication devices are
14 multi-line, to the extent that they are capable of operating on
15 at least two, but possibly more, distinct frequencies.
16 Accordingly, once the communication device 10 wanders outside of
17 the pre-established vicinity range of the piconet 24 an auto-
18 switching capability associated with the system and method of
19 the present invention preferably, but not necessarily,
20 automatically establishes communication between the wireless
21 communication device 10 and the over-the-air network 14. As set
22 forth above, the over-the-air network may be defined by
23 appropriate cellular/pager infrastructure, including server 18
24 or other communication networks such as, but not limited to,
25 satellite communication 17 and others.

1 The communication system and method of the present
2 invention also incorporates scanner capabilities, which is more
3 specifically incorporated within the aforementioned transceiver
4 assembly. Operative features of the scanner capabilities of the
5 present invention provide for preferably continuous scanning,
6 wherein the first and second transceivers 19 and 21 are
7 continuously searching to establish messaging communication
8 between compatibly configured computers 20 and wireless
9 communication devices 10. The scanning capabilities are
10 completed when, for example, one of the plurality of wireless
11 communication devices 10 wanders within the pre-established
12 vicinity range of the piconet 24 and includes a unique
13 identifier or code which is recognizable by the first
14 transceiver 19 associated with the computer 20. Upon
15 recognition and when all the pre-determined parameters have been
16 met, messaging communication between the computer 20 and the one
17 or more wireless communication devices 10 is established. The
18 communication system and method of the present invention also
19 includes selective configuration capabilities which allows a
20 user to configure his account to regulate data transmission to
21 a particular wireless communication device. Such selective
22 configuration can be accomplished via a particular communication
23 device 10 or alternatively through the website of the Internet
24 service provider 15 and/or the individual servers 16, at least
25 when an Internet type computerized network is utilized.

1 Turning to Figure 2, and by way of example only, a method
2 of operation and utilization of the communication system of the
3 present invention is illustrated. More specifically, in
4 operation anyone of the plurality of wireless communication
5 devices 10 is activated as at 30 and, through operation of the
6 continuous scanning capabilities, as set forth above, a first
7 and second transceiver 19 and 21, associated with the
8 transceiver assembly of the present invention, provide for a
9 "find-me-follow-me" procedure in an attempt to recognize one
10 another and establish messaging communication, as at 32. If the
11 aforementioned pre-determine parameters of identification and
12 vicinity range are not met the auto-switching capabilities of
13 the present invention are automatically operative to find an
14 appropriate, compatible over-the-air network such, as a
15 cellular/paging, satellite or other appropriate network, as at
16 34. However, assuming that the wireless communication device 10
17 locates an Internet access facility or computer as at 36, it is
18 next determined, through operative features of the transceiver
19 assembly and combined features of the scanning assembly, whether
20 the computer 20 is configured to recognize and communicate with
21 the wireless communication device 10, as indicated as 38. The
22 configuring of both the computer 20 and the wireless
23 communication device 10 is accomplished by the appropriate
24 programming of the first and second transceivers 19 and 21
25 defining the aforementioned transceiver assembly. Next,

1 assuming compatible configuration between the computer 20 and
2 the wireless communication device 10 as indicated at 40, it is
3 determined whether the computer 20 is configured to allow the
4 particular wireless communication device 10 to access the
5 Internet 12 as at 42. If the computer 20 is not so configured,
6 then the scan capability is operative to continue searching for
7 a computer which is compatible to the extent of allowing data
8 communication to be established with the particular wireless
9 communication device. However, if no computer can be located,
10 the auto-switching capability is again operative to transfer
11 data communication to an appropriate or compatible over-the-air
12 network 14, as at 44. However, if computer 20 is configured to
13 access the computerized network 12, data communication is
14 thereby established as at 46, wherein voice, video, alphanumeric
15 or other data may be sent or received by virtue of the piconet
16 24, over the computerized network 12, utilizing the network
17 service provider 15. If the connection is lost as at 48, the
18 auto-switching capability returns to the scanning capabilities
19 as at 49, 44 to continuously search for a compatible Internet
20 access facility or computer 20 or alternatively switches to
21 communication with an over-the-air network, as at 34.

22 Alternatively, and as explained above, if a predetermined
23 parameter of establishing data communication within the piconet
24 24, between computer 20 and the wireless communication device
25 10, is not established, such as by the wireless communication 10

1 being located outside the pre-established vicinity range, a
2 search is made for a compatible over-the-air network 14, such
3 as, but not limited to a cellular, or paging network
4 infrastructure and/or server 18 or other appropriate over-the-
5 air network, such as satellite communication. If one is not
6 found, as at 52, the auto-switching capabilities, as well as the
7 continuous scanning facility, are re-activated, as at 32 and the
8 procedure begins again. Alternatively, assuming that the
9 wireless communication devices are properly configured to
10 establish communication by means of the over-the-air network 14,
11 the decision as at 54 is made whether current data communication
12 may be established. If not, as at 56, the auto-switching and
13 scanning capabilities of the system are re-activated as set
14 forth above. Assuming that current communication is allowed as
15 at 55 data communication may be conducted, as at 58.

16 The system and method of the present invention may further
17 comprise selective configuration capabilities, as generally set
18 forth above and as indicated as 60 in Figure 2. This means that
19 the receipt of data by means of the over-the-air network 14 or
20 the computerized network 12, through the computer 20 may be pre-
21 configured by the user. More specifically, the user may
22 configure a particular account so as to regulate data
23 communication with the particular wireless communication device
24 10, in terms of how and when such data may be received on either
25 the computer 20 or the over-the-air network 14. By way of

1 example only, the user 10 may selectively configure the account,
2 utilizing either a particular wireless communication device 10
3 or alternatively the website of the Internet service provider
4 15, to establish communication, utilizing the transceiver
5 assembly to only accomplish compatible recognition between
6 specific computers 20 and certain wireless communication devices
7 10. Alternatively, the user can control or regulate what type
8 of data and/or at what time certain communications can be sent
9 by the over-the-air network 14 or over the Internet 12.

10 Since many modifications, variations and changes in detail
11 can be made to the described preferred embodiment of the
12 invention, it is intended that all matters in the foregoing
13 description and shown in the accompanying drawings be
14 interpreted as illustrative and not in a limiting sense. Thus,
15 the scope of the invention should be determined by the appended
16 claims and their legal equivalents.

17 Now that the invention has been described,